Remarks/Arguments:

Claims 1, 2, 4, 9-11, and 13-32 are pending.

Claims 3, 5-8, and 12 are cancelled, without prejudice or disclaimer.

Claim 1 is amended and claims 20-32 newly added, hereby.

Applicants have amended the claims of the present application to further define the invention and to clarify its scope. Independent claim 1 is amended such that it specifically defines the "polymer particles" present in the temperature sensitive microgel "deodorant" are formed by way of *precipitation polymerization*. More particularly, independent claim 1 has been amended to specify that the temperature-sensitive microgel "polymer particles," have a "lower critical solution temperature" and the polymer particles are formed "at a temperature above the lower critical solution temperature." Support for the amendment to claim 1 is found at page 5, lines 1 to 4, 16 to 24, Table 1, page 7, lines 19 to 26, working experimental example 1, at pages 11 and 12 of the present application, as well as in original claim 8.

In view of the amendment to claim1, applicants add new, independent claim 20 and claims 21-32 dependent thereon, which are specifically directed to a method of manufacturing a deodorant that involves *inverse suspension polymerization*. More particularly, independent claim 20 includes a "surface-active substance" in the polymerization reaction medium—for "forming polymer particles"—and, so, effect the formation of a water-in-oil emulsion. Support for new claim 20 can be found at page 7, line 28 to page 8, line 12, and in working example 2, at pages 12 and 13 of the

present application as filed. New claims 21-32 correspond to present claims 2, 4, 9, 10, 11, 13, 14, 15 16, 17, 18 and 19, respectively, made dependent (directly or indirectly) on new claim 20.

Claims 1, 2, 4, 8 to 11, and 13 to 19 were rejected under 35 USC 103(a) as allegedly obvious over US Patent No. 6,194,375 (*Ness*) in view of US Patent No. 6,303,711 (*Sumiya*) and US Patent No. 5,556,835 (*Inaoka*). Reconsideration is requested.

Ness teaches a perfume composition, in which the perfume is absorbed within organic polymer particles, and which incorporates a (functional) polymer having free hydroxyl groups, which polymer is retained at the exterior of the particles. The hydroxy functional polymer helps enhance deposition on the surface of skin, hair, and hard surfaces, and it participates in hydrogen bonding. Examples of the organic polymer (particles) include isobutylmethacrylate, hydroxypropyl methacrylate, hydroxyethylacrylate, etc. Examples of the functional polymer include hydroxypropylethylcellulose and polyvinyl alcohol. The functional polymer is present in an amount of up to 125% by weight. Cross-linking agents such as divinyl benzene diesters can be included in an amount up to 10% by weight. The organic polymer particles are reacted with the hydroxy functional polymer, cross-linking agent, and a polymerization initiator (i.e., 2,2'-azo(bis)isobutylnitrile). Examples of the perfume include benzyl alcohol, silicylate, monoterpenes, such as limonene, etc. The formulation may further contain additional ingredients such as aliphatic alcohols, polyols, etc.

The PTO acknowledges that *Ness* does not teach or suggest the "main monomer of (N-substituted alkyl)acrylamide" limitation or the "cross-linking agent" limitation (i.e., any of the recited

Markush group alternatives for the "cross-linking agent") on the rejected claims. The PTO alleges that Sumiya and Inaoka cure these deficiencies in Ness.

Sumiya discloses polymers having monomeric units derived from meth(acrylamide) and acrylic acid and, so, allegedly meets the "main monomer of (N-substituted alkyl)acrylamide" limitation on the rejected claims. Inaoka discloses the use of N,N'-methylenebisacrylamide—one of the recited Markush group alternatives for the "cross-linking agent" limitation on the rejected claims—as a cross-linking agent. According to the PTO, since Sumiya teaches that polymers having monomeric units derived from meth(acrylamide) were known in the art, and Inaoka teaches that N,N'-methylenebisacrylamide is known in the art as a cross-linking agent, it would have been *per se* obvious to modify Ness to use polymers having monomeric units derived from meth(acrylamide) and to use N,N'-methylenebisacrylamide as a cross-linking agent (i.e., polymers having monomeric units derived from meth(acrylamide) and N,N'-methylenebisacrylamide are allegedly *per se* obvious variations of monomers and cross-linking agents that are capable of cross-linking the main monomer and a functional monomer during the polymerization process that produces a deodorant product). With all due respect, the PTO's reasoning is fatally flawed.

The fact that all elements of a claimed invention are known does not, by itself, make the combination obvious. *Ex parte Clapp*, 227 USPQ 972 (BPA&I 1985).

> The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.

In re Fritch, 23 USPQ2d 1780, 1783-84 (Fed. Cir. 1992) (emphasis added).

> The mere fact that it is possible to find two isolated disclosures which might be combined in such a way as to produce a new compound does not necessarily render such production obvious unless the art also contains something to suggest the desirability of the proposed combination.

In re Bergel, 130 USPQ 206, 208 (CCPA 1961) (emphasis added). It is legally erroneous to reach a conclusion of obviousness under §103 solely on the basis that the claimed invention represents a "combination which only unites old elements with no change in their functions." *Pentec, Inc. v. Graphic Controls Corp.*, 227 USPQ 766, 771 (Fed. Cir. 1985). When the claimed invention requires modification of the prior art, there is no obviousness under §103 when "[t]he prior art does not suggest . . . [the] modification . . . or provide any reason or motivation to make the modification." *In re Laskowski*, 10 USPQ2d 1397, 1398 (Fed. Cir. 1989). "Reliance on *per se* rules of obviousness is legally incorrect and must cease." *In re Ochiai*, 37 USPQ2d 1127, 1129 (Fed. Cir. 1995). If the prior art fails to disclose a rationale for varying the teachings of a reference, it can not have been obvious to choose the claimed variation. *See In re Antonie*, 195 USPQ 6 (CCPA 1977).

Notwithstanding the failure of the PTO to establish a *prima facie* case of obviousness (as explained above), in order to advance prosecution applicants have amended the claims (as explained above). Specifically, claim 1 is amended to recite:

> A method of manufacturing a deodorant including the steps of:
> - forming polymer particles by reacting a main monomer of (N-substituted alkyl)acrylamide, a functional monomer for bonding the polymer particles to a fibrous substrate, a cross-linking agent, and an initiator and
> - loading a deodorant agent to the polymer particles,
>
> wherein the polymer particles have a lower critical solution temperature, and the polymer particles are formed at a temperature above the lower critical solution temperature,

wherein the deodorant agent is selected from the group consisting of C18:1 dioic acid, C18:2 dioic acid, and phenyl compounds,
wherein the cross-linking agent is selected from the group consisting of 2-(diethylamino)ethyl acrylate, 2-(dimethylamino)ethyl acrylate, 2-(dimethylamino)ethyl methacrylate, 2-(diethylamino)ethyl methacrylate, and N,N'-methylenebisacrylamide (BisAAm), and
wherein the main monomer is present at an amount of 80% to 90% by weight of the polymer particles, the functional monomer is present at an amount of 5% to 15% by weight of the polymer particles, and the cross-linking agent is present at an amount of 1% to 10% by weight of the polymer particles.

New independent claim 20 and claims 21-32 dependent thereon are added, whereby claim 20 provides:

A method of manufacturing a deodorant including the steps of:
- forming polymer particles by reacting a main monomer of (N-substituted alkyl)acrylamido, a functional monomer for bonding the polymer particles to a fibrous substrate, a cross linking agent, an initiator and a surface-active substance and
- loading a deodorant agent to the polymer particles,

wherein the deodorant agent is selected from the group consisting of C18:1 dioic acid, C18:2 dioic acid, and phenyl compounds,
wherein the cross-linking agent is selected from the group consisting of 2-(diethylamino)ethyl acrylate, 2-(dimethylamino)ethyl acrylate, 2-(dimethylamino)ethyl methacrylate, 2-(diethylamino)ethyl methacrylate, and N,N'-methylenebisacrylamide (BisAAm), and
wherein the main monomer is present at an amount of 80% to 90% by weight of the polymer particles, the functional monomer is present at an amount of 5% to 15% by weight of the polymer particles, and the cross-linking agent is present at an amount of 1% to 10% by weight of the polymer particles.

The present claims further patentably distinguish the instant invention from the cited references, for the following reasons.

Ness teaches a perfumed product comprising a mixture of (1) an active ingredient selected from the group consisting of a detergent, a fabric softening agent, and a hair-conditioning agent and

(2) solid particles that are insoluble in water. The solid particles comprise an organic polymer core, which has a perfume absorbed therein, and at the exterior of the core there is a hydroxy functional polymer attached, which forms a shell that covers at least part of the core. The shell is permeable to perfume and water does not remove the hydroxy functional polymer from the core. The hydroxy functional polymer incorporates free hydroxy groups and is present in a quantity of no more than 25% of the weight of the particles.

Ness has found that such polymer enhances deposition (or retention) of the particles on skin, hair, hard surfaces—especially vitreous surfaces—and fabric and by doing so also enhances deposition of the perfume. Thus, the use of such particles can enhance deposition of perfume, or components thereof; and, it can retard the evaporation of deposited perfume and also enhance the extent to which deposited perfume survives a subsequent drying step. Further, as the particles themselves are insoluble in water, they can be deposited from an aqueous wash or rinse liquor. The perfumed products of Ness are particularly useful as personal washing compositions, fabric detergent compositions, cleaning compositions, and fabric and hair conditioner compositions

Sumiya teaches a water-absorbent or water-retention material, which is not easily subjected to an influence of salts and has high absorbency, even for a highly concentrated salt solution containing a high concentration of metal ion. Specifically, the water-absorbent or water-retention material comprises a water-absorbent resin and a polymer derived from monomer unit components comprising (a) 40 to 99 wt. % of hydroxyl group-containing water-soluble mono(meth)acrylate, (b) 1 to 60 wt. % of at least one monomer selected from the group consisting of acrylic acid,

methacrylic acid, acrylic acid alkali metal salt, and methacrylic acid alkali metal salt, (c) 0.00001 to 3 wt. % of a crosslinking agent, and (d) optionally not more than 10 wt % of another water soluble ethylenicaly unsaturated monomer. In addition, the water-absorbent or water-retention material comprising the water absorbent resin has a hydrolysis resistant crosslinking structure.

Sumiya found that, in order to obtain the water-absorbent resin, which has excellent salt resistance, the crosslinking agent is used. Examples of the crosslinking agent (c) include a radical copolymerizable crosslinking agent having two or more double bonds in the molecule and a reactive crosslinking agent having two or more functional groups that react with a hydroxyl group and/or carboxyl group.

Furthermore, the water-absorbent or water-retention materials may be provided, at an arbitrary step in the production of the water-absorbent resin, with additives such as antiseptic agents, anti-mold agents, disinfectants, antioxidants, ultraviolet-absorbers, coloring agents, perfume agents, and deodorants.

The water absorbent resin, as taught by *Sumiya*, may be applied for absorbing or retaining various aqueous liquids. Examples of suitable aqueous liquids include water (including soft water and hard water); aqueous liquids of relatively low ion content, for example, body fluids (body exudates, such as urine, menstrual discharge and would exudates) and aqueous liquids containing larger amounts of metal ion, for example, seawater and other saline waters.

Inaoka teaches a gel-like fragrance composition, which includes (1) an aqueous gel comprising an aqueous fluid and a gelling agent and (2) an oil-absorbent resin that has absorbed a

fragrant material. The oil-absorbent resin, which is dispersed in the aqueous gel, is a cross-linked polymer comprising 90 to 99.999% by weight of a monofunctional monomer component mainly comprising an unsaturated monomer having a solubility parameter of not more than 9 and at least one polymerizable unsaturated group in the molecule, and 0.001 to 10% by weight of a cross-linkable monomer component having at lest two polymerizable unsaturated groups or reactive substituents in the molecule.

With this specific combination of components, *Inaoka* found the gel-like fragrance composition exhibits a widened fragrance selection spectrum, with excellent lasting fragrancy and deodorant effect, and will-balanced aroma, and in particular with good durability of the fragrance during the later period of use. According to Inaoka, in consideration of its excellent properties, the gel-like fragrance composition is useful in a broad field, e.g., as a fragrant deodorant for the home (in a toilet, bathroom, or living room), inside a vehicle, and as a multi-purpose fragrance product for admixing with pharmaceuticals and pesticides.

Ness teaches a perfume composition in which the perfume is absorbed within the organic polymer particles which further incorporate a polymer with free hydroxyl groups that remain at the exterior of the particles. Although Ness neither teaches nor suggests the "main monomer of (N-substituted alkyl)acrylamide" limitation or the "cross-linking agent" limitation on the rejected claims, the PTO asserts that for the reasonand *Inaoka* teaches cross-linking monomer particles and cross-linking agent, independent claim 1 and the claims dependent thereon of the present application are obvious in view of these prior art references.

Furthermore, the PTO asserts that one of ordinary skilled in the art would have been motivated to use the instantly claimed main monomers because meth(acrylamide) is a known main monomer for use in the manufacturing of deodorant products, as suggested by *Sumiya*. Moreover, the PTO asserts that one of ordinary skill in the art would have been motivated to use the instantly claimed cross-linking agents because N,N'-methylenebisacrylamide and divinylbenzene are known cross-linking agents for use in fragrance compositions, as suggested by *Inaoka*.

While the rejection cannot be maintained against the rejected claims, as explained above, independent claim 1 has been amended such that it is specifically directed to a method of manufacturing a deodorant by way of *precipitation polymerization*. More particularly, independent claim 1 has been amended to specify that the polymer particles which are suitable for use in the temperature sensitive microgel deodorant formed by precipitation polymerization have a lower critical solution temperature, and the polymer particles are formed at a temperature above the lower critical solution temperature.

New independent claim 20 and claims dependent thereon are directed to a method of manufacturing a deodorant by way of *inverse suspension polymerization*. More particularly, independent claim 20 specifically includes a surface-active substance in the polymerization reaction medium, which the formation of a water-in-oil emulsion.

None of the cited references—taken alone or in combinatin—teaches or suggests manufacturing a deodorant by way of either precipitation polymerization or inverse suspension polymerization. Since "the cited references do not support each limitation of [the present] claim[s],"

applying the §103(a) rejection against any of the present claims would be "inadequate on its face." *In re Thrift*, 63 USPQ2d 2002, 2008 (Fed. Cir. 2002). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 165 USPQ 494, 496 (CCPA 1970). When conducting an obviousness analysis, "all limitations of a claim must be considered in determining the claimed subject matter as is referred to in 35 U.S.C. 103 and it is error to ignore specific limitations distinguishing over the [prior art] reference." *Ex parte Murphy*, 217 USPQ 479, 481 (PO Bd. App. 1982).

Applicants also wish to point out the teachings of *Ness* are specifically directed to a perfumed product which is provided in such a way that the perfume absorbed in the organic polymer core of the water-insoluble solid particles of the perfumed product can be retained on skin, hair, hard surfaces especially vitreous surfaces and fabric after deposition of the particles onto the skin, hair, hard surfaces especially vitreous surfaces and fabric. For the reason that the particles themselves are insoluble in water, they can be deposited from an aqueous wash or rinse liquor. Thus, the use of such particles can enhance deposition of perfume, or components thereof; and it can retard the evaporation of deposited perfume and also enhance the extent to which deposited perfume survives a subsequent drying step. In view of the above, the perfumed products as taught by *Ness* are particularly useful as personal washing compositions, fabric detergent compositions, cleaning compositions and fabric or hair conditioner compositions.

Ness does not teach or suggest the method of making the *temperature sensitive microgel deodorant* as presently claimed. In view of the absence of the deodorant agent and cross-linking

agent in the perfumed product of *Ness* and that the *Ness* perfumed product is directed to an entirely different use from the deodorant made by the presently claimed method, applicants submit that there is in no way that a person skilled in the art would, in view of the teachings of *Ness*, would have been led to the presently claimed invention.

Although *Sumiya* teaches meth(acrylamide)as a main monomer and *Inaoka* teaches N,N'-methylenebisacrylamide and divinylbenzene as a known cross-linking agent, there is no teachings for *Sumiya* and *Inaoka* on the compositions being a temperature sensitive microgel deodorant.

Thus, there is no motivation or suggestion from the teachings of *Ness* that a person skilled in the art upon reading this reference would combine it with the teachings of *Sumiya* and *Inaoka* to arrive at the methods of preparing a deodorant that can be applied to a fibrous material so as to provide a controlled release of deodorant agent upon contact with warm body fluid or human skin. Accordingly, there would be no motivation or suggestion to a person skilled in the art to combine the teachings of *Ness* with those of *Sumiya* and *Inaoka* to be led to the method presently claimed.

The presently claimed invention is directed to a method of manufacturing a deodorant, which deodorant releases deodorant agents at certain temperatures and has improved adherence to textiles. In particular, in the presently claimed method, the deodorant is loaded into the polymer particles (or microgels) during the synthesis of the microgels or it can be absorbed into the microgels bound to the fibrous materials due to hydrophobic interactions between the deodorant and the stationery phase. Thus, upon contact with warm body fluid or human skin, the microgels shrink and with the change in hydrophobicity, the deodorant is released in a controlled manner.

Specifically, the temperature sensitive microgel deodorant produced by the presently claimed method is synthesized by *precipitation polymerization* or *inverse emulsion polymerization*. In both polymerizations, the polymeric microgel particles—as recited in the present claims—are copolymers of at least three different monomers: (1) a main monomer of (N-substituted alkyl)acrylamide present at an amount of 80 to 90% by weight of the polymer particles; (2) a functional monomer present at an amount of 5 to 15% by weight of the polymer particles; and (3) a cross-linking agent present at an amount of 1 to 10% by weight of the polymer particles. Furthermore, in both polymerizations, an initiator is included in the microgel particles.

In the method of manufacturing a temperature sensitive microgel deodorant as presently claimed by way precipitation polymerization, the polymer particles have a lower critical solution temperature and the polymer particles are formed at a temperature above the lower critical solution temperature. This is specified in present claim 1 (i.e., as amended). For example, the lower critical solution temperature (LCST) of poly-N-isopropylacrylamide poly (NIPAM) in a aqueous medium is about 32°C. Thus, it will be precipitated if the polymerization temperature is above 32°C during polymerization. At LCST, poly(NIPAM) undergoes a reversible phase transition resulting in the collapse of the microgel structure due to the hydrophobic interaction between isopropyl groups in the polymer chain.

In the method of manufacturing a temperature sensitive microgel deodorant as presently claimed by way inverse emulsion polymerization, there is included a surface-active substance in the polymerization reaction medium, which promotes the formation of a water-in-oil emulsion. This

is specified in new, independent claim 20 and the (new) claims dependent thereon. Specifically, the surface-active substance aids in the dispersion of the aqueous solution of a hydrophilic monomer in the continuous hydrophobic oil medium.

As can be seen from the working examples 1 to 8 of the present application, only with the exercise of undue experimentation did the present inventors find that only the particular combination of components in their specific range amounts as presently claimed provided a deodorant with the above properties. It should be further emphasized that it is with the particular combination of the components in their specific range amounts together with the specific sequence of steps as recited in the present claims, that the present inventors found an effective method of manufacturing a deodorant capable of releasing deodorant agents at certain temperatures, which also has improved adherence to textiles.

For the above reasons, *Ness* does not teach the present invention as claimed and there is no motivation to combine the *Ness* reference with the *Sumiya* and *Inaoka* references in order to suggest the presently claimed invention. The present invention as defined in amended claim 1—and claims dependent thereon—and new, independent claim 20—and claims dependent thereon—is not obvious over *Ness* in view of *Sumiya* and *Inaoka*, allegations to the contrary by the PTO notwithstanding.

In view of the foregoing remarks, the rejection of claims under §103(a), based on the combined teachings of *Ness*, *Sumiya*, and *Inaoka*, is overcome. Withdrawal of the rejection appears to be in order.

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Favorable action is requested.

Respectfully submitted,

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